

# Datalogger lot

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# Datalogger IoT 課程



@宅老大數位 2025/3/8

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進階程式範例 - RS-485串接

# Datalogger lot 介紹及開發環境建立

# Datalogger IoT 簡述



首頁 | 解決方案 | 開發者專區 | 雲服務 | 論壇 | 相關連結 | 登入



## Datalogger (by Kevin's Lab)



Partner Designed



Manual



Buy it



Tutorial



### MCU

Part Number: RTL8720DF

32-bit KM4 (Arm Cortex-M33 compatible)

32-bit KMO (Arm Cortex-M23 compatible)



### MEMORY

512KB SRAM + 4MB Flash



### KEY FEATURES

Integrated WiFi 4 (802.11 b/g/n 1x1) SoC

Dual-band, 2.4GHz or 5GHz

Bluetooth LE 5.0

Bluetooth high-power mode up to 10dB

Low Power Mode

Auto Download Mode

On-board PCB antenna

DC IN: 6V ~ 24V

DC OUT: 5V / 1A

Arduino Uno mounting holes

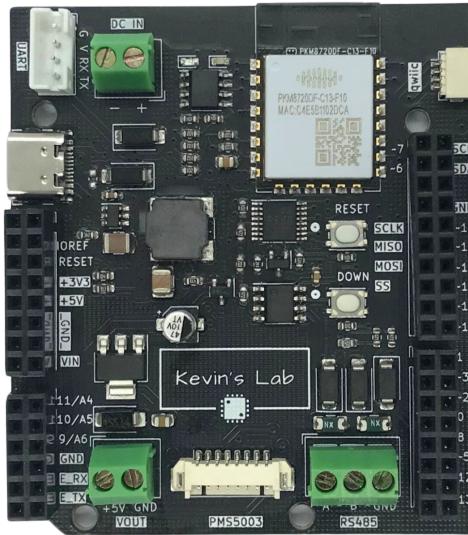
Popular Connectors: qwiic(I2C), UART(JST2.0), RS485

UART expansion

RS485 with TVS + PTS protection and 120-ohm resistor

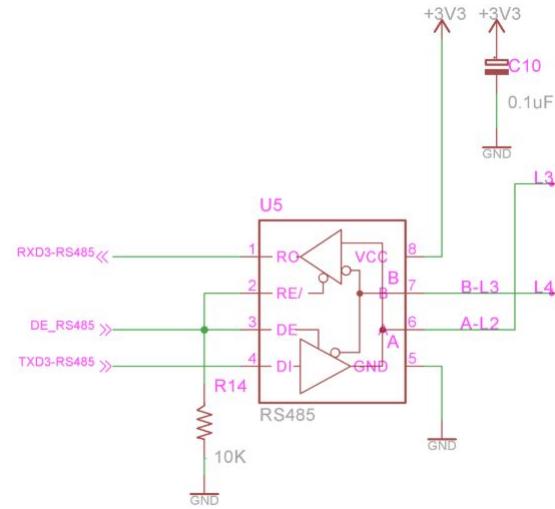
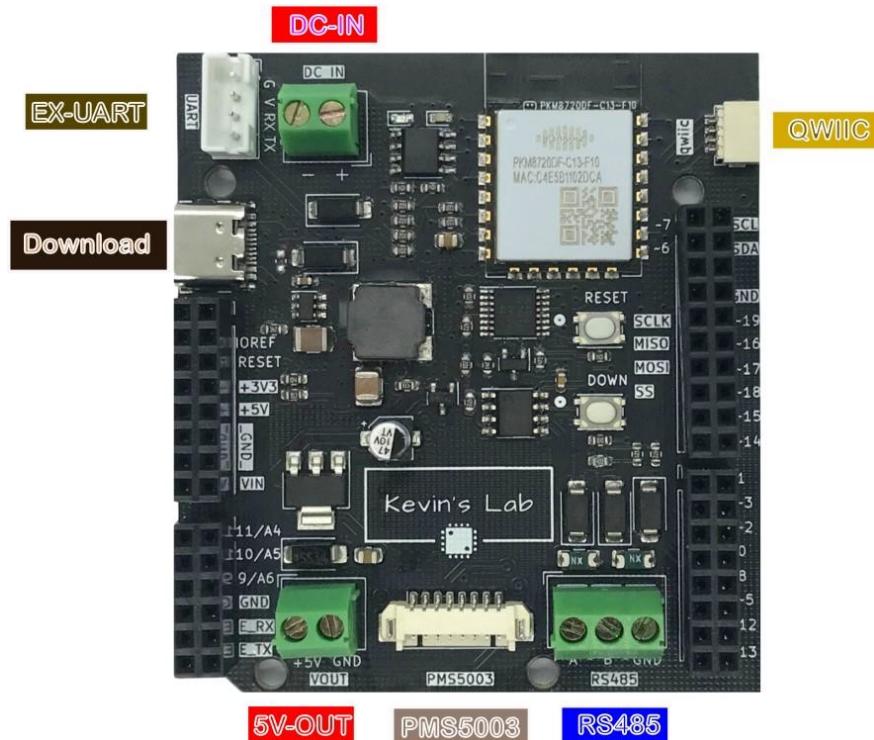
# Datalogger IoT 簡述

- 針對工業應用需求設計的 UNO 開發板
- 內建 qwiic 介面,支援多種 I2C 傳感器模組快速擴充
- 集成 RS485 通訊介面,內置 PTS 和 TVS 保護電路
- 內置專用 PMS5003 顆粒物傳感器連接器,方便接線
- 集成 RS485 通訊介面,內置 PTS 和 TVS 保護電路
- 內置專用 PMS5003 顆粒物傳感器連接器,方便接線



- 支援 12V~24V 直流電源輸入,適用於工業電源供應
- PCB 板上設有電源管理、過載和短路保護功能
- 擴展接腳包括 GPIO、ADC、PWM 等,滿足多樣化需求
- 附帶 Arduino IDE 開發環境和豐富的範例程式碼
- 體積小巧,適合嵌入式工業設備和現場監控應用
- 可廣泛應用於工業自動化、環境監測、智慧城市等領域

# Datalogger IoT 簡述

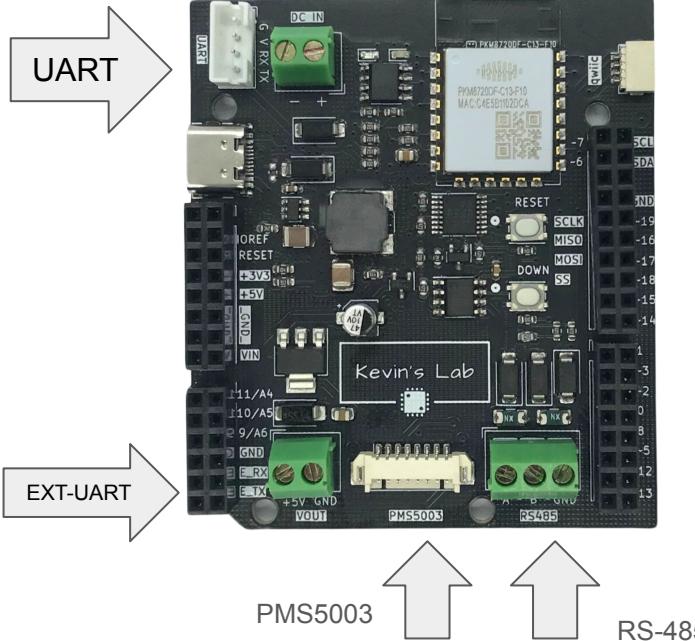


- RS485 電路已有 120 歐姆 電阻
- DE - /RE 不需要控制

# Datalogger IoT 簡述

- RS-485 基本介紹及應用
  - <https://youtu.be/kVcQPMIYbYw>
- 工具軟體及簡報
  - <https://reurl.cc/ZZ3RoM>

# UART 擴充



Share UART2 (Serial2).	S1	S0
PMS5003	0	0
RS485	0	1
UART (JST 2.0mm)	1	0
EXT-UART	1	1

# 切換UART 使用方法

<https://www.amebaiot.com/zh/amebad-amb26-arduino-getting-started/>

	GPIO pin	GPIO INT	ADC	PWM	UART
0	PA15	✓			
1	PA14	✓			
2	PA13	✓		✓	SERIAL2_RX
3	PA12	✓		✓	SERIAL2_TX

```
#define S0 1
#define S1 0

void setup() {
    pinMode(S0, OUTPUT);
    pinMode(S1, OUTPUT);

    digitalWrite(S0, LOW);
    digitalWrite(S1, HIGH);
}
```

# 切換UART 使用方法

```
#define S0 1
#define S1 0

int chr;
void setup() {
    // put your setup code here, to run once:
    Serial.begin(115200);
    Serial2.begin(9600);

    pinMode(S0, OUTPUT);
    pinMode(S1, OUTPUT);

    digitalWrite(S0, LOW);
    digitalWrite(S1, HIGH);

    delay(500);

    Serial2.println("TEST Serial");
}


```

## Serial\_read\_test.ino

```
void loop() {
    // put your main code here, to run repeatedly:

    if(Serial2.available()){
        while((chr = Serial2.read()) > 0){
            Serial2.println(char(chr));
        }
    }
    delay(100);

    //Serial2.println("TEST Serial");
    delay(500);
}
```

# 切換UART 使用方法

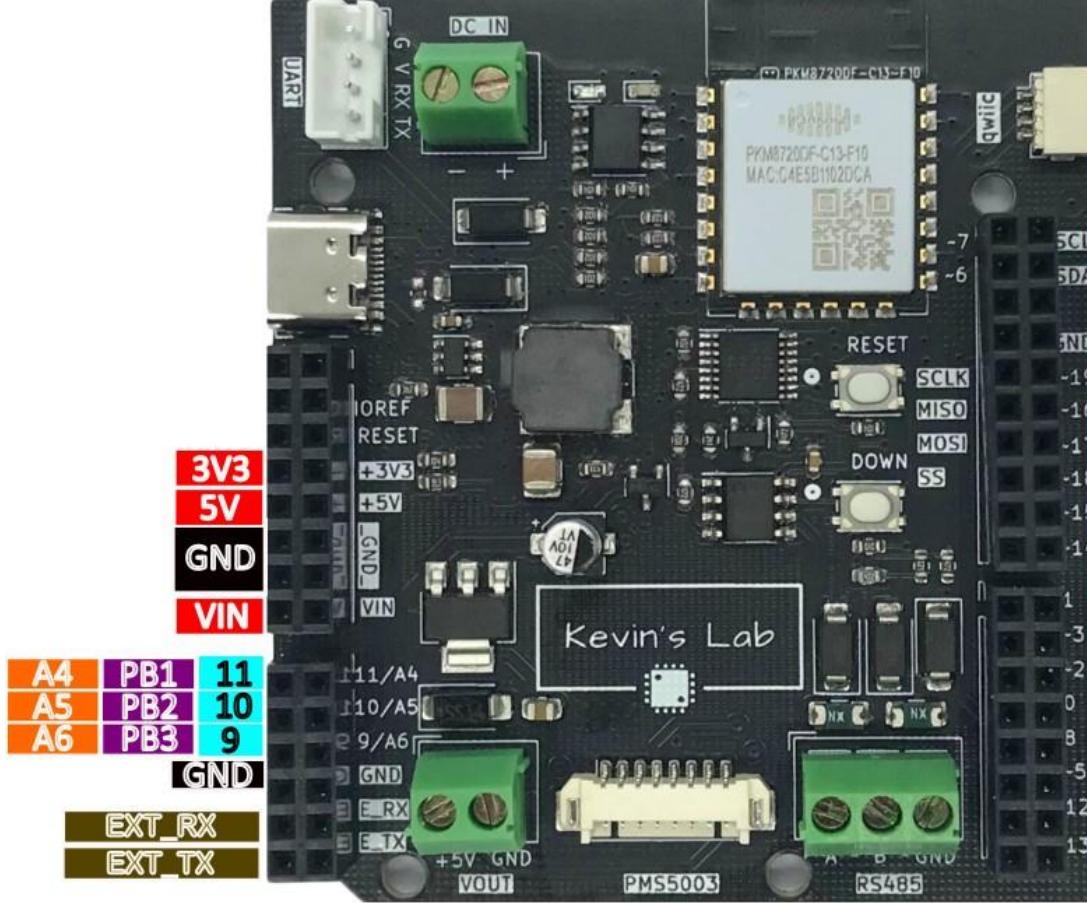
<https://www.amebaiot.com/zh/amebad-amb26-arduino-getting-started/>

PMS3003\_AirQuality.ino

	GPIO pin	GPIO INT	ADC	PWM	UART
0	PA15	✓			
1	PA14	✓			
2	PA13	✓		✓	SERIAL2_RX
3	PA12	✓		✓	SERIAL2_TX

```
#include <SoftwareSerial.h>  
  
SoftwareSerial mySerial(2, 3); // RX, TX
```





7	PA25	PWM	SCL		
6	PA26	PWM	SDA		
GND					
-19	19	PB20	PWM	SPI_SCLK	
-16	16	PB19	PWM	SERIAL1_TX	SPI_MISO
-17	17	PB18	PWM	SERIAL1_RX	SPI_MOSI
-18	18	PB21	PWM	SPI_SS	
-15	15	PB22	PWM		
-14	14	PB23	PWM		
1	PA14	SPI1_SCLK			
3	PA12	PWM	SERIAL2_TX	SPI1_MOSI	
2	PA13	PWM	SERIAL2_RX	SPI1_MISO	
0	PA15	SPI1_SS			
8	PA27				
5	PA28	PWM			
12	PA7	LOG_TX			
13	PA8	LOG_RX			

VCC

GND

GPIO

ANALOG

PWM

I2C

UART

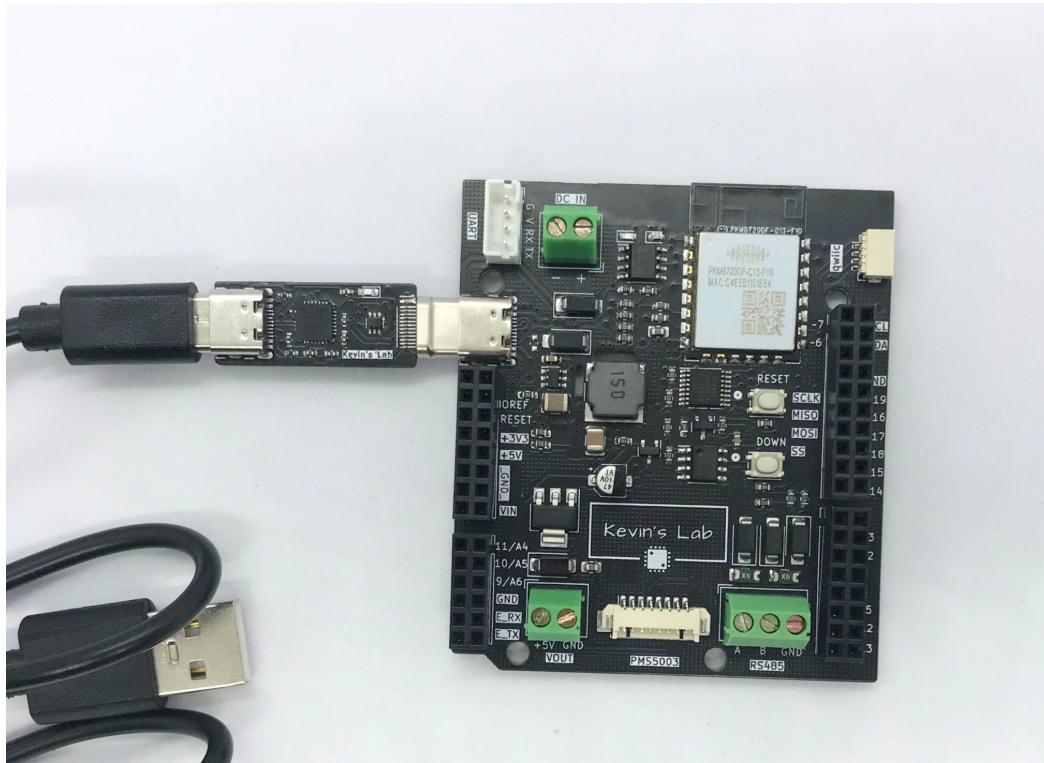
SPI

- USB 上傳工具驅動程式
- Arduino IDE 安裝
- 執行 Blink 程式測試

# USB 上傳工具



# USB 上傳工具



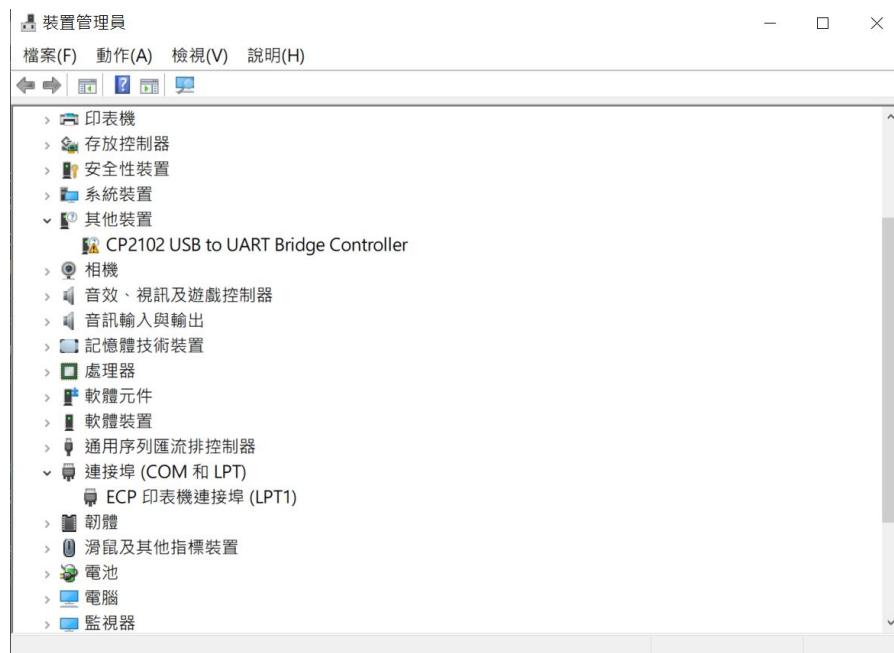
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# USB 上傳工具

將USB 上傳工具接入 Type-C 及電腦

如果在 裝置管理員 出現 驚嘆號,

表示需要安裝驅動程式



# USB 上傳工具

開啟網頁：

<https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers?tab=downloads>

# USB 上傳工具

## Windows 選擇

### CP210x Windows Drivers

#### Software Downloads

Software (10)

## Mac 選擇

### CP210x VCP MAC OSX Driver

Software · 10

CP210x Universal Windows Driver

v11.3.0

6/24/2023

CP210x VCP Mac OSX Driver

v6.0.2

10/27/2021

CP210x Windows Drivers

v6.7.6

9/4/2020

CP210x Windows Drivers with Serial Enumerator

v6.7.6

9/4/2020

CP210x\_5K\_AppNote\_Archive

9/4/2020

CP210x\_VCP\_Win2K

9/4/2020

Linux 2.6.x VCP Revision History

9/4/2020

Linux 3.x.x/4.x.x/5.x.x VCP Driver 🔒

v3.x.x/4.x.x/5.x.x

1/29/2021

VCP Driver for WinCE60

v2.1

9/4/2020

VCP Drivers for WinCE50

v2.1

9/4/2020

# USB 上傳工具

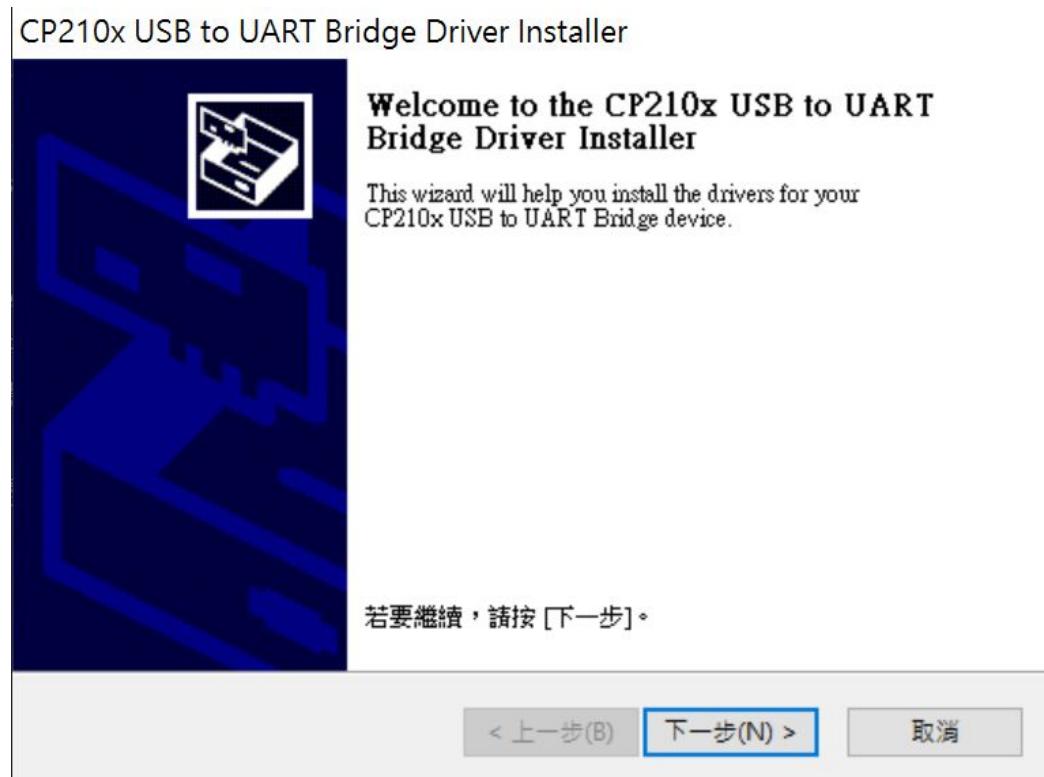
下載後，並解壓縮。找到

CP210xVCPIInstaller\_x64.exe

並執行它

# USB 上傳工具

按下一步繼續，  
按指示安裝。



# USB 上傳工具

重新拔插 Type-C

# 下載及安裝 Arduino IDE

## 下載點

[arduino.cc/en/software](https://arduino.cc/en/software)



### Arduino IDE 2.1.0

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code navigation, and even a live debugger.

For more details, please refer to the [Arduino IDE 2.0 documentation](#).

Nightly builds with the latest bugfixes are available through the section below.

## DOWNLOAD OPTIONS

**Windows** Win 10 and newer, 64 bits

**Windows** MSI installer

**Windows** ZIP file

**Linux** AppImage 64 bits (X86-64)

**Linux** ZIP file 64 bits (X86-64)

**macOS** Intel, 10.14: “Mojave” or newer, 64 bits

**macOS** Apple Silicon, 11: “Big Sur” or newer, 64 bits

[Release Notes](#)

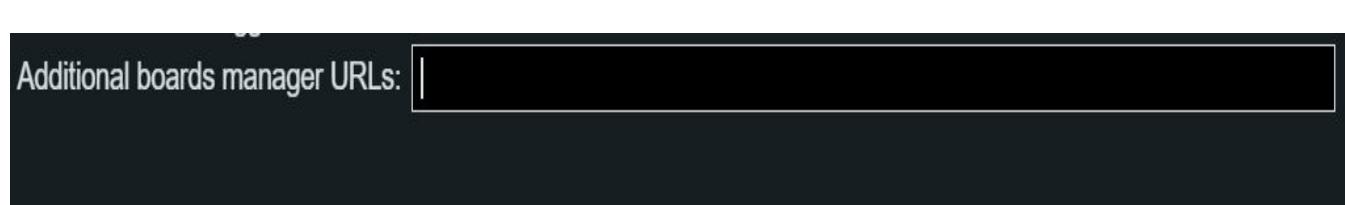
# Arduino 設定

複製以下連結

[https://github.com/ambiot/ambd\\_arduino/raw/master/Arduino\\_package/package\\_realtek\\_amebad\\_index.json](https://github.com/ambiot/ambd_arduino/raw/master/Arduino_package/package_realtek_amebad_index.json)

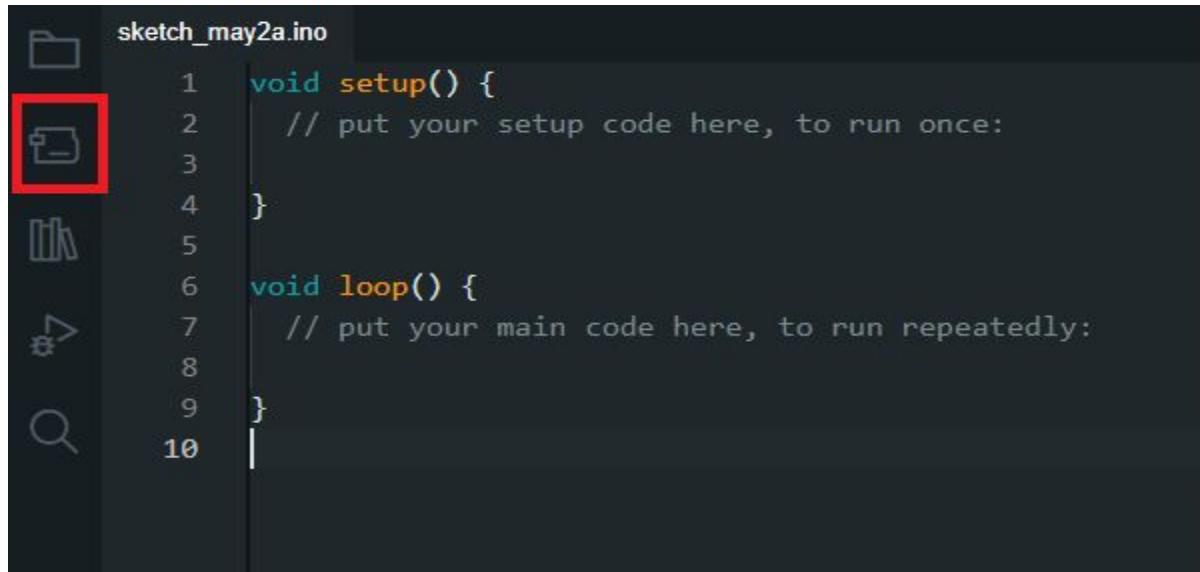
開啟 File / preferences

在 Additional boards manager URLs 的欄位 貼上 上述網址, 點 OK  
結束設定



# Arduino 設定

點取左側 第二個圖示， Boards Manager

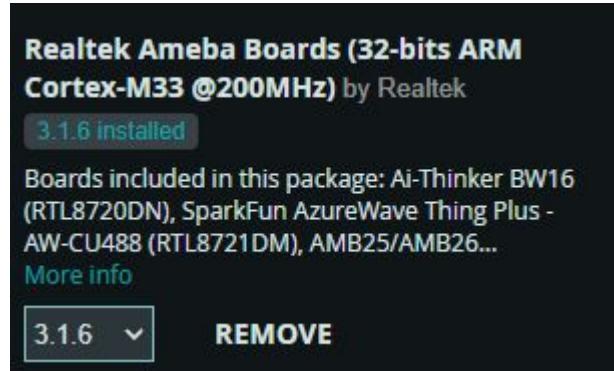


The image shows the Arduino IDE interface. On the left, there is a vertical toolbar with several icons: a folder, a file (highlighted with a red box), a book, a gear, and a magnifying glass. The main area displays a sketch named "sketch\_may2a.ino". The code contains the standard setup and loop functions:

```
1 void setup() {
2     // put your setup code here, to run once:
3
4 }
5
6 void loop() {
7     // put your main code here, to run repeatedly:
8
9 }
10
```

# 開發環境安裝 - Arduino 設定

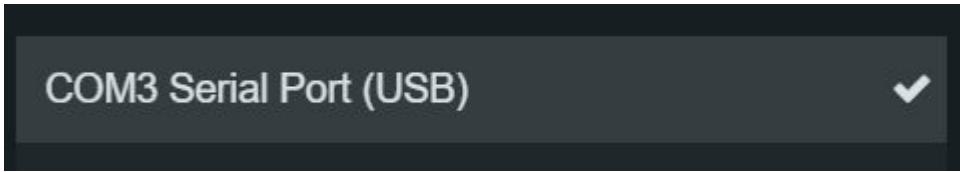
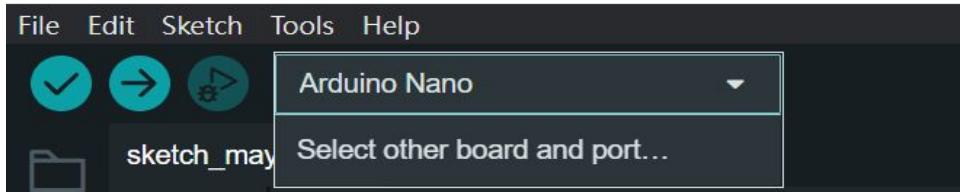
輸入 ameba



選擇 Realtek Ameba Boards (32-bits ARM Cortex-M33 @200MHz)  
建議安裝 V3.1.6 版本，V3.1.7 不建議

# 開發環境安裝 - Arduino 設定

透過 USB 連接 開發板



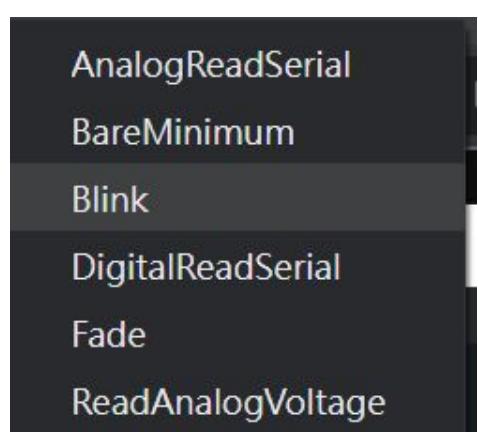
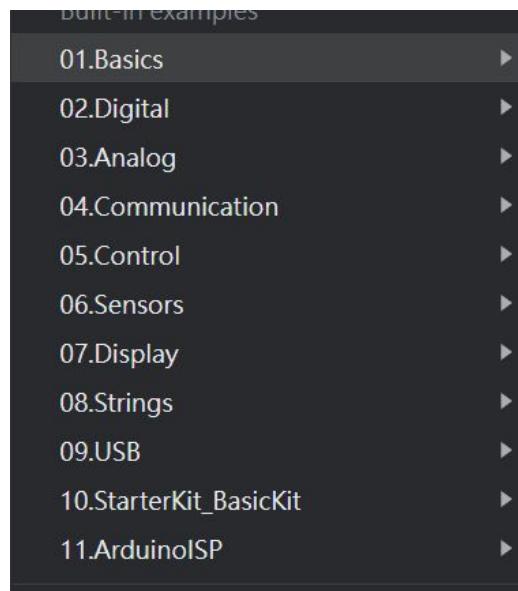
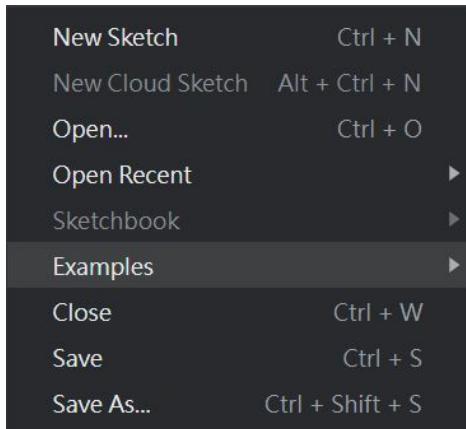
選擇 Select other board and port

Board 選擇 AMB25/AMB26(RTL8720DF)

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# 第一個程式

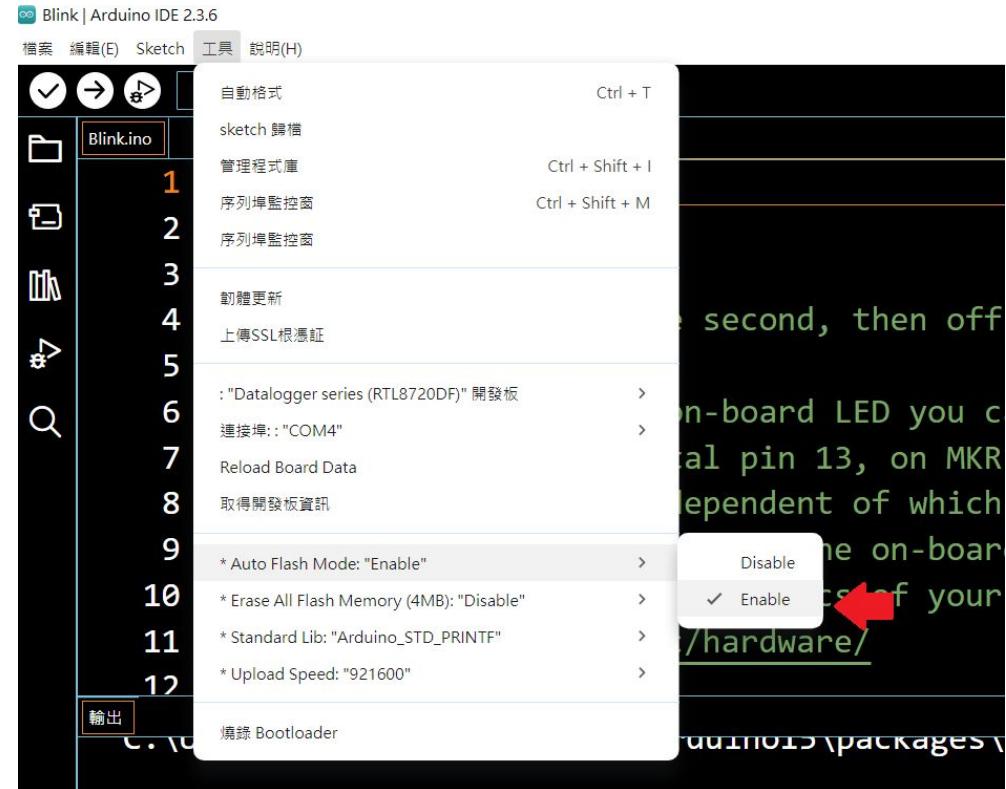
打開 File / Examples / 01.Basics / Blink



# 第一個程式

工具 / Auto Flash Mode

選擇 Enable



# 第一個程式

執行上傳



# 常用程式庫安裝及使用

# 常用程式庫安裝及使用

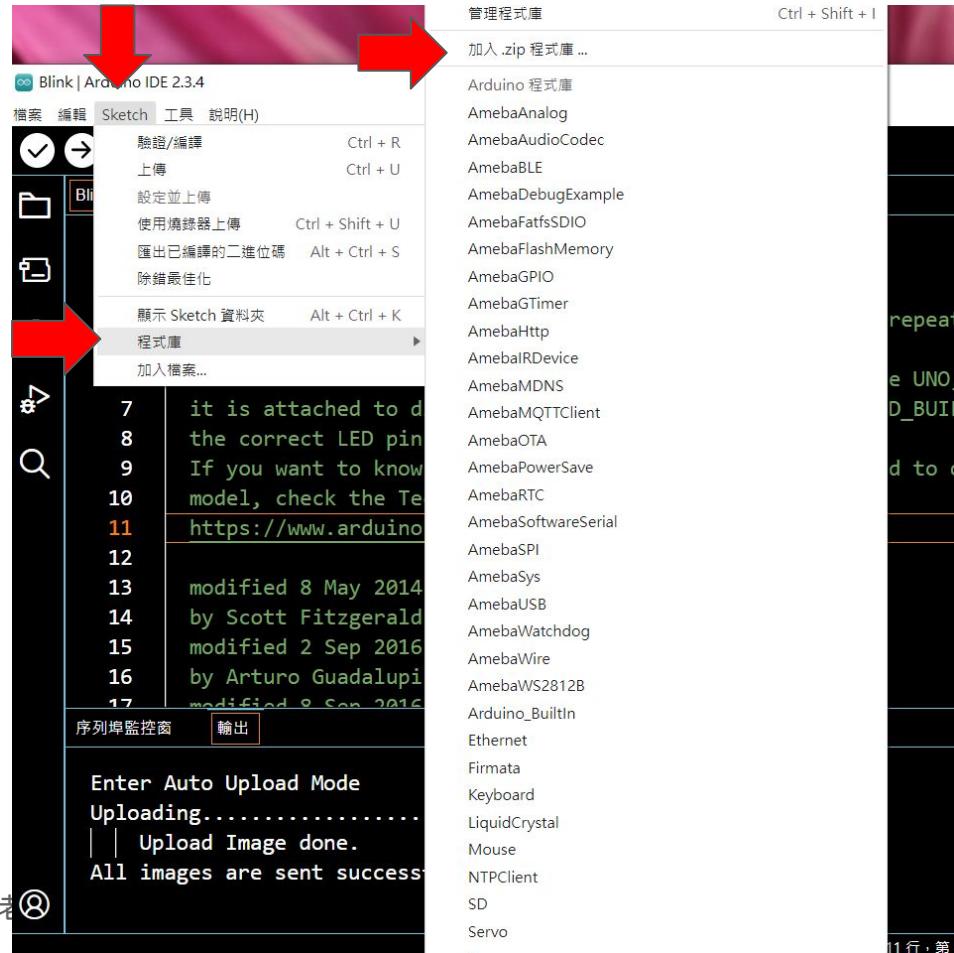
- 範例程式及資料 (操作手冊及程式庫)
  - [https://github.com/cold63/Datalogger\\_Iot/tree/main](https://github.com/cold63/Datalogger_Iot/tree/main)

The screenshot shows the GitHub repository page for 'Datalogger\_Iot'. The repository is public and has a main branch, 2 branches, and 0 tags. It includes a search bar, a 'Go to file' button, an 'Add file' button, and a 'Code' button. Below the header, there is a list of recent commits:

Commit	Message	Time
	cold63 Merge pull request #24 from cold63/master	7fc850c · 35 minutes ago
	libraries upload library, sd card and rs485	36 minutes ago
	src update data	last week
	tools add software tool , serial port utility	2 weeks ago
	Datalogger開始_安裝及使用_V1_0.pdf update user	last week
	README.md update README.md	4 months ago

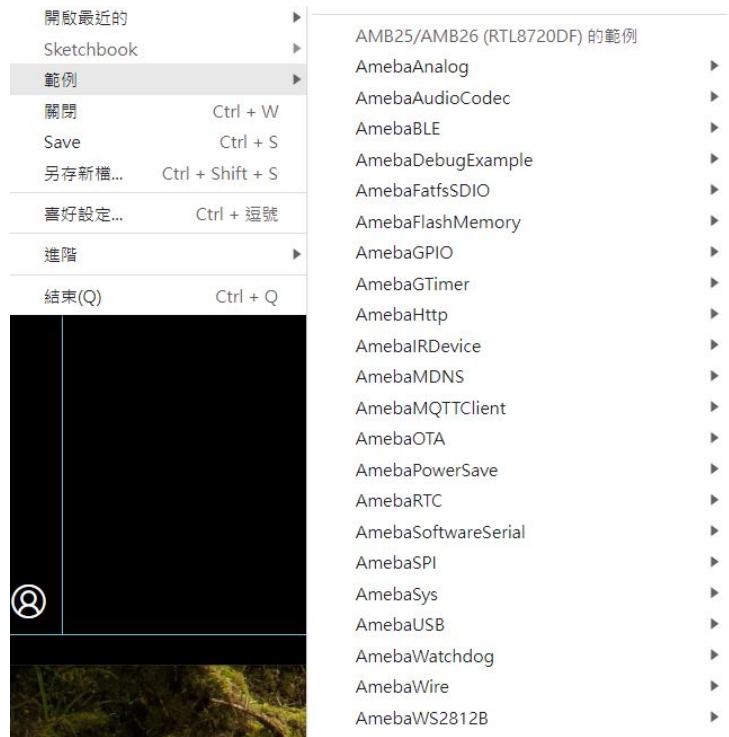
# 常用程式庫安裝及使用

## 安裝 Zip 程式庫的方法



# 常用程式庫安裝及使用

## Realtek 提供的 Arduino 範例



# 常用程式庫安裝

- RS-485
  - *ModbusMaster* by Doc Walker (Arduino IDE 安裝)
  - *Modbus-Master-Slave-for-Arduino* (下載安裝)
- SD Card
  - *SdFat* (下載安裝)
- Oled
  - u8g2

Zip 封裝的程式庫下載點

[https://github.com/cold63/Datalogger\\_lot/tree/main/libraries](https://github.com/cold63/Datalogger_lot/tree/main/libraries)



# 常用程式庫安裝

- GPS
  - TinyGPSPlus by Mikal Hart



# 常用程式庫安裝

- SHT40溫溼度感測器
- SCD41 CO2感測器
- SGP41 VOC 感測器



- 更多說明

- 簡報 PPT

[https://drive.google.com/file/d/1\\_ziPKTQeGlfK6sR4qf2s5Ucs9x7\\_mVnH/view?usp=drive\\_link](https://drive.google.com/file/d/1_ziPKTQeGlfK6sR4qf2s5Ucs9x7_mVnH/view?usp=drive_link)

- 影片教學

<https://youtu.be/PnugtvNAYm4?si=vTWu-wSavQ1MqrZg>

- LoRa 擴展板

- *LoRa* (Arduino-LoRa)
- 影片教學

<https://youtu.be/6fWbL9OZpi4?si=70gOtnDco5ruITBp>

- 簡報 PPT

<https://reurl.cc/Kdbn3y>

